

From: [Owens, Robert](#)
To: [Mueller, Brian](#)
Subject: Arsenic Speciation - Falcon Refinery RI/FS
Date: Thursday, August 14, 2014 11:20:37 AM

Brian:

We have been evaluating arsenic speciation for the next round of soil sampling at the Falcon Refinery to help determine if the arsenic is a result of past agricultural activities in the area. Based on discussions with our experts and several analytical laboratories, it appears that arsenic speciation would, most likely, not provide any useful information pertaining to the source of the arsenic. An indication that pesticides and/or herbicides applied to the region may be the source of high arsenic levels is a sufficiently high levels of organic arsenic species specific to arsenic based herbicides/pesticides in the sample results. Two major factors that affect the results are 1) the specific herbicide and/or pesticide applied and its quantity, and 2) the elapsed time since the application of the herbicide/pesticide.

We currently do not know what herbicides or pesticides were used in the area so we cannot establish the actual arsenic species signature of the herbicides/pesticides used. We could possibly establish a general arsenic species signature for the herbicides and pesticides used in South Texas during the time period of interest. This alone would reduce our confidence level with the results of any arsenic speciation evaluation. The more significant concern is the elapsed time since the herbicides/pesticides were deposited. Herbicide or pesticide based arsenic will degrade into different arsenic species subject to the soil matrix and environment over the course of time. The longer the time since application the greater the degradation and number of altered arsenic species signatures. Based on the aerial photographs, agricultural activities in the barge dock area ceased in the early 1960's and the remainder of the site soon thereafter. There have been over 45 years since agricultural activities would have possibly deposited any herbicide or pesticide based arsenic at the site. The alternations to the herbicide/pesticide arsenic species over this period of time would mask any useful results.

We recommend against conducting an arsenic speciation evaluation with the next round of sampling at the site. Please let me know if you would like for us to conduct this evaluation.

Thank you,
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